Tagging of Herring in British Columbia During the 1982-1983 Herring Season

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July 1984

Canadian Industry Report of Fisheries and Aquatic Sciences No. 151

Canadian Industry Report of Fisheries and Aquatic Sciences

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Cat. No. Fs 97-6/151E ISSN 0706-6457

Correct citation for this publication:

Haegele, C. W. 1984. Tagging of herring in British Columbia during the 1982-83 herring season. Can. Ind. Rep. Fish. Aquat. Sci. 151: 54 p.

TABLE OF CONTENTS

	Page
LIST OF TABLES	iv
LIST OF FIGURES	vi
ABSTRACT	vii
INTRODUCTION	1
METHODS	1
RESULTS	2
Tag releases	2
Tag recoveries	3
ACKNOWLEDGMENTS	6
REFERENCES	6
TABLES	8
FIGURES	35
APPENDIX TABLES	53

LIST OF TABLES

Table 1. Herring tags inserted in British Columbia during the 1982-83 herring season - by tag number series.

Table 2. Herring tag releases in Johnstone Strait in the fall of 1982.

Table 3. Herring tag releases in the lower Strait of Georgia and in Juan de Fuca Strait in the fall of 1982.

Table 4. Herring tag releases on the west coast of Vancouver Island in the spring of 1983.

Table 5. Age distribution of herring in tagging sets made in Johnstone Strait in the fall of 1982.

Table 6. Age distribution of herring in tagging sets made in the lower Strait of Georgia and in Juan de Fuca Strait in the fall of 1982.

Table 7. Age distribution, percent maturity, and average gonosomatic index of herring in seine sets for spring 1983 taggings on the west coast of Vancouver Island.

Table 8. Number of tag recoveries from the beginning of tagging in the fall of 1979 to the end of the 1982-83 fishing season.

Table 9. Number of tag recoveries by the period at large for the 1979-80 to 1982-83 seasons.

Table 10. Summary of major tag releases on the south coast of British Columbia.

Table 11. Tons of catch for fisheries, by gear, in which tags from south coast taggings were recovered.

Table 12. Plant recovery rates used for tag recovery adjustments.

Table 13. Expected tag returns from seine and gillnet fisheries.

Table 14. Recoveries in 1980-83 fisheries from 1980-81 fall taggings offshore the west coast of Vancouver Island.

Table 15. Tag density in population for 1980-83 fisheries from 1980-81 fall taggings offshore the west coast of Vancouver Island.

Table 16. Recoveries in the 1983 roe fisheries from 1982 fall taggings in inner Juan de Fuca Strait.

Table 17. Tag density in population for 1983 roe fisheries from 1982 fall taggings in the inner Juan de Fuca Strait.

Table 18. Recoveries in 1981-83 herring fisheries from 1980-82 fall taggings in the lower Strait of Georgia.

Table 19. Tag density in population for 1981-83 fisheries from 1980-82 fall taggings in the lower Strait of Georgia.

Table 20. Recoveries in 1983 roe fisheries from 1982 fall taggings in Johnstone Strait.

Table 21. Tag density in population for 1983 roe fisheries from 1982 fall taggings in Johnstone Strait.

Table 22. Recoveries in 1983 roe fisheries from 1982 spring taggings in Barkley Sound.

Table 23. Tag density in population for 1983 roe fisheries from 1982 spring taggings in Barkley Sound.

LIST OF FIGURES

Fig. 1. Map of Discovery Passage showing fall 1982 Johnstone Strait (A) tagging locations.

Fig. 2. Map of Okisollo Channel showing fall 1982 Johnstone Strait (B) tagging locations.

Fig. 3. Map of the lower east coast of the Strait of Georgia showing fall 1982 (C) tagging locations.

Fig. 4. Map of the inner Juan de Fuca Strait showing fall 1982 (D) tagging locations.

Fig. 5. Map of Barkley Sound showing spring 1983 (E) tagging locations.

Fig. 6. Map of Clayoquot Sound showing spring 1983 (F) tagging locations.

Fig. 7. Map of the upper west coast of Vancouver Island showing spring 1983 (G) tagging locations.

Fig. 8. Map of Pender Harbour showing summer 1983 (H) tagging location.

Fig. 9. Statistical areas for the south coast of British Columbia.

ABSTRACT

Haegele, C. W. 1984. Tagging of herring in British Columbia during the 1982-83 herring season. Can. Ind. Rep. Fish. Aquat. Sci. 151: 54 p.

Herring were tagged with external anchor tags in southern British Columbia during the 1982-83 season as follows: 11,881 released in Johnstone Strait in November; 18,797 in the lower Strait of Georgia between November and January; 3,925 in the inner Juan de Fuca Strait in November; 18,200 on the west coast of Vancouver Island in March; and 976 in Pender Harbour in June. There were 492 tags recovered during the 1982-83 season, for a total of 1,682 recoveries since tagging began in the fall of 1979. Tag recoveries were summarized for major taggings and roe and food fisheries on the south coast and estimates of fish dispersal from fall and winter aggregations and stock discreteness were made.

Key words: Pacific herring, stock identification, tagging, migration

RÉSUMÉ

Haegele, C. W. 1984. Tagging of herring in British Columbia during the 1982-83 herring season. Can. Ind. Rep. Fish. Aquat. Sci. 151: 54 p.

Pendant la saison de pêche de 1982-1983 dans la région méridionale de la Colombie-Britannique, on a apposé des étiquettes externes à ancrage sur des harengs. Ils ont été remis en liberté selon le schème suivant: 11,881 dans le détroit Johnstone en novembre; 18,797 dans la partie inférieure du détroit de Géorgie entre novembre et janvier; 3,925 dans la partie intérieure du détroit Juan de Fuca en novembre; 18,200 sur la côte ouest de l'Île Vancouver en mars et 976 dans le port de Pender en juin.

Pendant la saison 1982-1983, 492 étiquettes ont été récupérées ce qui porte le total à 1,682 depuis le début de l'étiquetage à l'automne 1979. Pour la côte sud, le nombre d'étiquettes récupérées est résumé selon les principales séries d'étiquetage et les pêches du hareng roguê et de subsistance. On a fait des estimations de la dispersion du poisson à partir des concentrations automnale et hivernale et de la ségrégation des stocks.

Mots-clés: hareng du Pacifique, identification des stocks, étiquetage, migration

INTRODUCTION

In British Columbia herring have been tagged with external anchor tags since the fall of 1979 to determine stock distribution and migration. Initially tagging was done coastwide but since 1982 it has been confined to the south coast.

The subject of this report is tagging and tag returns for the 1982-83 herring season (July 1, 1982 to June 30, 1983). As well, tag recovery results from major south coast taggings (fall 1980 to spring 1982) are summarized.

METHODS

Herring were tagged with Floy anchor tags (Type FD-68BC) of two dimensions: "long" tags that had a 42 mm long plastic portion, bearing the printed legend, which was connected to the toggle by a 15 mm long piece of monofilament; and "short" tags that had a 32 mm long plastic portion connected to the toggle by an 8 mm long piece of monofilament. A Floy "fine fabric" tag, with dimensions similar to "short" tags but of a finer gauge, was used to tag juvenile herring. All "long" and "fine fabric" tags were colored international orange; "short" tags were either international orange, orange, yellow, white, pink or green. All tags were inserted with an applicator gun near the anterior margin of the dorsal fin. "Short" and "long" tags and different tag colours were used to determine whether tag retention is affected by tag size and whether tag colour affects survival of tagged fish. Results from these experiments will not be known for another season.

Fish were captured by seine, dipnetted from the seine into a plastic tub partially filled with seawater, tagged and returned to the seine. The entire catch, containing both tagged and untagged fish, was released after tagging was completed.

Samples of fish were obtained from most sets. These fish were frozen and later sampled for length, age, sex, weight and gonad weight.

Posters describing the tagging program were placed in fish processing plants and fisheries offices. Postage pre-paid tag return envelopes were made available at these locations. Returned tags were entered in prize draws. There was a draw for tags returned between July 1, 1982 and Jan. 30, 1983 and a draw for tags returned between Feb. 1, 1983 and June 30, 1983. In each draw 16 prizes totalling $1,500 were awarded (Appendix tables 1 and 2).

RESULTS

TAG RELEASES

In the 1982-83 season, herring were tagged in the fall of 1982 in Johnstone Strait and the lower Strait of Georgia, in the spring of 1983 on the west coast of Vancouver Island, and in the summer of 1983 in the Pender Harbour area. There were 53,779 tagged fish released, which are listed by tag number series in Table 1. Tagging locations are shown in Figs. 1 to 8 and tag releases are summarized by season and location in Tables 2 to 4.

Johnstone Strait

There were 11,881 tagged herring released from 13 seine sets made from the CALIGUS in Kanish, Deepwater and Chonat bays between November 9 and 23, 1982 (Table 2; Figs. 1,2). These fish were 71% 2- and 3-year-old (Table 5). There were an estimated 80,000 tons of herring in the area during this period (R. Armstrong, pers. comm.).

Strait of Georgia

In Stuart and Trincomali channels there were 18,797 tagged herring released from 21 seine sets made from the CALIGUS, WALKER ROCK, and VAMPY I between November 9, 1982 and January 18, 1983 (Table 3, Fig. 3). A further 3,925 tagged herring were released off Albert Head and Race Rocks from 4 sets made from the VAMPY I between November 24-26, 1982 (Table 3, Fig. 4). Herring released in the Strait of Georgia were 78% 3-yr and 4-yr-old (Table 6). There were an estimated 10,000 tons of herring in the area in the middle of December 1982 and 25,000 tons in the middle of January, 1983 (R. Armstrong, pers. comm.).

West coast of Vancouver Island

There were 18,200 tagged herring released on the west coast of Vancouver Island between February 24 and March 13, 1983 (Table 4).

In Barkley Sound there were 6,438 herring tagged from 6 sets made from the PACHENA #1 (Fig. 5). These fish were all sexually mature and were composed of about equal proportions (21% to 29%) of 3-, 4- and 5-yr-old fish, with 25% of the fish 6-yr-old and older (Table 7).

In Clayoquot Sound there were 6,336 tagged herring released from 6 sets made from the OCEAN HORIZON between February 26 and March 7, 1983 (Fig. 6). These fish were all sexually mature (Table 7). The fish tagged in Steamer Cove were 76% 2- and 3-yr-old, those in the other sets were older: 30% 3-yr-old, 23% 4-yr-old, 18% 5-yr-old and 25% 6-yr-old and older.

Herring were tagged from sets made from the BERNICE C in Nootka Sound (1 set, 718 tags) and Esperanza Inlet (3 sets, 2,951 tags) between February 26 and March 7, 1983 and 1,757 herring were tagged from a spawn-on-kelp pond operated by Don Cameron in Winter Harbour (Fig. 7). The fish tagged from the sets made from the BERNICE C were sexually mature, those tagged in Winter Harbour had spawned in the pond (Table 7). Fish from two of the sets in Esperanza Inlet were 80% 5-yr-old and older, fish from the other taggings were 20% 3-yr-old, 31% 4-yr-old, 16% 5-yr-old and 33% 6-yr-old and older (Table 7).

An estimated 50,000 tonnes of herring spawned on the west coast of Vancouver Island in 1983 (Haist and Stocker 1984).

Pender Harbour

Nine hundred and seventy six juvenile herring (1- and 2-yr-old) were tagged on June 12, 1983 from a set made by the WALKER ROCK in Bargain Bay (Fig. 8).

TAG RECOVERIES

There were 492 tags recovered during the 1982-83 season and details on date and locality of release and recapture, fishery, gear and tag type are published in a data report by Haegele and Hop Wo (1984). Recoveries were obtained from all tagging periods except from the first tagging in the fall of 1979 (Table 8). Over one-half of the tags were at large for over 3 months and 65 tags were at large for over one year (Table 9).

Queen Charlotte Islands

There have been no taggings in the Queen Charlotte Islands since the spring of 1981, hence there were few recoveries. Five recoveries were made in the Juan Perez Sound 1983 seine roe fishery and one recovery in the Poole Inlet 1983 gillnet roe fishery. Three returns were from taggings made in the area of recovery two years (2 tags) and three years (1 tag) previous, one return was from a December 1980 tagging in Browning Entrance, and one each from spring 1982 taggings in Kitkatla Inlet and Barkley Sound. These returns do not add any new information to conclusions drawn from the 39 tags recovered from Queen Charlotte Islands taggings and fisheries prior to the 1982-83 season (Haegele et al. 1983).

North Coast

There was no sac-roe fishery on the North Coast in 1983, hence the opportunity for recoveries from the substantial spring 1982 tagging on the North Coast (17,443 tags) was limited. However, the virtual absence of

recoveries from outside the area would indicate that this is a discrete stock unit. The 9 recoveries in the 1982-83 season add no new information to the 107 tag returns made prior to July 1, 1982 (Haegele et al. 1983).

Central Coast

There has been no tagging in the Central Coast since the spring of 1981 and there was only one return from a Central Coast tagging and one recovery in a Central Coast fishery during the 1982-83 season.

South Coast

There have been several substantial taggings on the south coast to examine the movement of herring to their spawning grounds (Table 10). As well there have been fisheries in all major statistical areas (Fig. 9) although not in all years (Table 11). Tag returns from these taggings have been sufficient to allow a quantitative estimate of fish dispersal from their fall and winter aggregations and to determine the fidelity with which herring return to spawn in the same area in subsequent years. Return from roe and food fisheries have been adjusted for plant recovery rates (Table 12) and fishing gear. The fishing gear adjustment is based on calculations that show that for a "normal" population only 80% of the tagged fish are susceptible to capture by gillnets within one year after tagging (Table 13). In subsequent years there is no gillnet selectivity and it is assumed that seine and trawl gear do not fish selectively. From the information on adjusted recoveries, releases and catch, tag densities (tags per 10,000 released per 1,000 ton) in the population were calculated.[1]

Offshore west coast Vancouver Island

There have been 55 adjusted returns from the September 1980 tagging offshore the west coast of Vancouver Island and 100 adjusted returns from the September 1981 tagging (Table 14). Tag densities from these taggings have been generally the same in Areas 23, 17N and 17S for spawning stocks (Table 15). Areas 24 and 25 spawning stocks have had both higher (1981), lower (1982) and similar (1983) tag densities to Area 23 spawners. Area 14 spawners have had similar or lower tag densities than Areas 17N and 17S spawners. There were no recoveries in Areas 15 and 27 from offshore taggings. It would appear that fish from offshore the west coast of Vancouver Island dispersed uniformly to spawn around the coastline of Vancouver Island from Esperanza Inlet (Area 25) to Comox Harbour (Area 14), but not to Areas 27 and 15. Whether they also dispersed to areas where there have been no recent fisheries (i.e. Areas 26, 12, 13, 29 and Washington) remains unknown.

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[1]The 1983 roe catch in Statistical Area 17S was entirely for charter payment. Recoveries and tag densities calculated from this catch are shown in parenthesis in tables 14 to 23.

Inner Juan de Fuca Strait

There were 41 adjusted recoveries from fish tagged in the inner Juan de Fuca Strait in late November 1982 (Table 16). These fish went mostly to Areas 17S and 17N to spawn, although tag density in Area 17N was only twice as high as in Area 23 (Table 17). Tag density in Area 15 was one-quarter of tag density in Area 17N and tag density in Area 14 was very low. It would appear that herring found late in November in the inner Juan de Fuca Strait were late offshore migrants that spawned mostly in Area 17S and 17N, with some of the fish leaving the straits to spawn in Area 23. Offshore migrants that spawned in Area 14 appear to have entered the Strait of Georgia earlier than in late November.

Lower Strait of Georgia

There have been 63 adjusted recoveries from 1980 fall taggings in the lower Strait of Georgia, 537 recoveries from 1981 taggings, and 411 recoveries from 1982 taggings (Table 18). Tag densities in the spawning population from these taggings were highest and about the same for Areas 17S and 17N (Table 19). Tag densities in Area 14 were generally one-quarter and in Area 15 0.12 of those in Areas 17N and 17S. Some tags were recovered in the same season in Area 23, however tag densities were 7% and 2% of those in Areas 17N and 17S, respectively. During the second season at large this increased to 18% of tag density in Area 17N and 5% of tag density in Area 17S. Area 15 tag density was low, 12% of tag density in Area 17N and 45% of tag density in Area 14. There were also 64 (unadjusted) recoveries in special license fisheries in Area 17S in December and January from fall 1982 taggings.

The recoveries indicated that fish found in Area 17S in November and December are mostly those fish that spawned in Areas 17N and 17S. Some of the spawners of Areas 14 and 15 were also found here. The small number of recoveries from west coast of Vancouver Island roe fisheries suggest that Strait of Georgia spawners returned mostly to the Strait of Georgia in subsequent years, the maximum amount of emigration was 10% in the first year.

Johnstone Strait

The taggings made in Johnstone Strait in the fall of 1982 yielded only 39 adjusted recoveries from 11,881 released (Table 20), compared to 411 recoveries from 18,797 released in the lower Strait of Georgia. This would indicate that only 10% of the fish in Johnstone Strait entered roe fisheries. The low recoveries may be partially related to the high proportion of 2-yr-old fish (19%), which may not have matured, in Johnstone Strait taggings compared to 4% for Strait of Georgia taggings. With such low recoveries, the tag density was also quite low and about equal in Areas 15, 14 and 17N (Table 21).

Barkley Sound

There were 55 adjusted recoveries from spring 1982 taggings in Area 23; 49 (90%) of these were recovered in the Area 23 roe fishery, the remainder in roe fisheries in Areas 17N and 14 (Table 22). Tag density was 6 and 30

times higher in Area 23 than in Areas 17N and 14, respectively (Table 23). Unfortunately there was no herring fishery in Area 24 and therefore no opportunity for recovery but it would appear that herring returned with good fidelity, probably in excess of 80%, to Area 23 since tag density was 4.83 after 1 yr at large. For comparison, tag density in Area 17S was 4.18 after 370 days at large (1981 fall tagging - 1982 food fishery).

South coast summary

The pattern of stock movements for the south coast remains somewhat unclear. However, additional recoveries from taggings to date and from taggings to be made in the fall of 1983 should clarify the pattern that is beginning to emerge.

It is clear that herring that spawn around the coastline of Vancouver Island from Esperanza Inlet to Comox Harbour are found offshore the west coast of Vancouver Island in the late summer and early fall. Most of the fish that spawn in Area 14 emigrate into the Strait of Georgia earlier, perhaps in October, than those that spawn in Areas 17N and 17S, and do not appear to be a significant portion of the large aggregation of herring that hold in the lower Strait of Georgia from November to January. These fish are mostly Areas 17S and 17N spawners. The fish that aggregate in the lower Johnstone Strait in November, and presumably migrate from summer feeding grounds through Queen Charlotte Strait, do not appear to contribute substantially to Strait of Georgia roe fisheries. At the very least, Strait of Georgia stocks are discrete from west coast of Vancouver Island stocks.

ACKNOWLEDGMENTS

L. Hop Wo assisted in all phases of the tagging project. R. Armstrong and D. Chalmers fished and tagged from the WALKER ROCK. D. Miller, L. Rosenfeld, V. Haist and T. Soames directed the tagging from the other vessels. P. Ostrander obtained tag recovery information in the processing plants.

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Table 1. Herring tags inserted in British Columbia during the 1982-83 herring season - by tag number series. [Tag mth. refers to method of capture (SN=seine). Tag type refers to tag size and colour as described in methods section.]

Tag series	Division	Section	Locality	Map ref.	Tag mth.	Tag type	Date rel.
H291500 - 291999	Strait of Georgia	Yellow Point	Scott Island	(C07)	SN	Long - I	09/11/82
H292050 - 292499	Strait of Georgia	Other Area 17	Secretary Islands	(C02)	SN	Long - I	23/11/82
H292600 - 292999	Strait of Georgia	Other Area 17	Hall Island	(C03)	SN	Long - I	24/11/82
H293000 - 293999	West Coast of Van. Is.	Other Area 23	Coaster Channel	(E01)	SN	Long - I	11/03/83
H294000 - 294499	Johnstone Strait	Kanish Bay	Kanish Bay	(A02)	SN	Long - I	10/11/82
H294500 - 294999	Johnstone Strait	Other Area 13 Strait	Chonat Bay	(B02)	SN	Long - I	11/11/82
H295000 - 295499	Johnstone Strait	Kanish Bay	Kanish Bay	(A04)	SN	Long - I	17/11/82
H295500 - 295999	Johnstone Strait	Kanish Bay	Kanish Bay	(A05)	SN	Long - I	17/11/82
H296000 - 297999	Strait of Georgia	Other Area 17	Chemainus	(C01)	SN	Long - I	15/11/82
H298000 - 298999	Strait of Georgia	Yellow Point	Pilkey Point	(C10)	SN	Long - I	16/11/82
H299000 - 299499	Strait of Georgia	Yellow Point	Yellow Point	(C13)	SN	Long - I	19/11/82
H299500 - 299999	Strait of Georgia	Other Area 17	Wallace Island	(C04)	SN	Long - I	28/11/82
H300000 - 300999	Strait of Georgia	Other Area 19	Race Rocks	(D03)	SN	Long - I	25/11/82
H301000 - 301999	Strait of Georgia	Other Area 19	Race Rocks	(D04)	SN	Long - I	26/11/82
H302000 - 302499	West Coast of Van. Is.	Macoah Pass	St. Ines Island	(E03)	SN	Long - I	26/02/83
H302500 - 302999	West Coast of Van. Is.	Macoah Pass	Shears Islands	(E04)	SN	Long - I	27/02/83
H313000 - 313499	Strait of Georgia	Yellow Point	Yellow Point	(C08)	SN	Short- I	09/11/82
H313500 - 313999	Strait of Georgia	Yellow Point	De Courcy Island	(C09)	SN	Short- I	15/11/82
H314500 - 314999	West Coast of Van. Is.	Meares Island	Hecate Bay	(F05)	SN	Short- I	04/03/83
H315000 - 315499	West Coast of Van. Is.	Meares Island	Maurus Channel	(F06)	SN	Short- I	07/03/83
H316000 - 316999	Johnstone Strait	Kanish Bay	Kanish Bay	(A01)	SN	Short- I	09/11/82
H319000 - 319499	Johnstone Strait	Kanish Bay	Deepwater Bay	(A06)	SN	Short- I	18/11/82
H319500 - 319999	Johnstone Strait	Kanish Bay	Deepwater Bay	(A07)	SN	Short- I	22/11/82

Table 1 (cont'd)

Tag series	Division	Section	Locality	Map ref.	Tag mth.	Tag type	Date rel.
H320000 - 320999	Strait of Georgia	Yellow Point	Kulleet Bay	(C16)	SN	Short- I	30/11/82
H323500 - 323999	West Coast of Van. Is.	Nuchatlitz Inlet	Centre Island	(G02)	SN	Short- O	26/02/83
H324000 - 324499	West Coast of Van. Is.	Nuchatlitz Inlet	Rosa Island	(G03)	SN	Short- O	27/02/83
H324500 - 324999	West Coast of Van. Is.	Nuchatlitz Inlet	Centre Island	(G04)	SN	Short- O	27/02/83
H325000 - 325999	Strait of Georgia	Yellow Point	Boulder Point	(C14)	SN	Short- O	29/11/82
H326000 - 326499	Johnstone Strait	Other Area 13 Strait	Chonat Bay	(B04)	SN	Short- O	16/11/82
H326500 - 326999	Johnstone Strait	Other Area 13 Strait	Chonat Bay	(B03)	SN	Short- O	16/11/82
H328000 - 328499	Johnstone Strait	Other Area 13 Strait	Chonat Bay	(B05)	SN	Short- O	23/11/82
H328500 - 328999	Johnstone Strait	Other Area 13 Strait	Chonat Bay	(B06)	SN	Short- O	23/11/82
H329000 - 329599	Strait of Georgia	Other Area 19	Race Rocks	(D02)	SN	Short- O	24/11/82
H329600 - 329849	Strait of Georgia	Other Area 19	Race Rocks	(D03)	SN	Short- O	25/11/82
H329850 - 329949	Strait of Georgia	Other Area 19	Race Rocks	(D02)	SN	Short- O	24/11/82
H329950 - 329974	Strait of Georgia	Other Area 19	Race Rocks	(D03)	SN	Short- O	25/11/82
H329975 - 329999	Strait of Georgia	Other Area 19	Race Rocks	(D02)	SN	Short- O	24/11/82
H330000 - 330499	Strait of Georgia	Yellow Point	De Courcy Island	(C20)	SN	Short- O	08/12/82
H330500 - 330999	Strait of Georgia	Yellow Point	De Courcy Island	(C21)	SN	Short- O	08/12/82
H333000 - 333499	Strait of Georgia	Yellow Point	Yellow Point	(C08)	SN	Short- Y	09/11/82
H333500 - 333501	Strait of Georgia	Yellow Point	De Courcy Island	(C09)	SN	Short- Y	15/11/82
H333502 - 333999	Strait of Georgia	Yellow Point	Ruxton Pass	(C11)	SN	Short- Y	17/11/82
H334000 - 334499	West Coast of Van. Is.	Macoah Pass	St. Ines Island	(E03)	SN	Short- Y	26/02/83
H334500 - 334999	West Coast of Van. Is.	Macoah Pass	Shears Islands	(E04)	SN	Short- Y	27/02/83
H335000 - 335999	Strait of Georgia	Other Area 19	Albert Head	(D01)	SN	Short- Y	24/11/82
H336000 - 336499	Johnstone Strait	Kanish Bay	Kanish Bay	(A02)	SN	Short- Y	10/11/82
H336500 - 336999	Johnstone Strait	Other Area 13 Strait	Chonat Bay	(B01)	SN	Short- Y	11/11/82
H339000 - 339499	Johnstone Strait	Kanish Bay	Kanish Bay	(A04)	SN	Short- Y	17/11/82
H339500 - 339999	Johnstone Strait	Kanish Bay	Kanish Bay	(A05)	SN	Short- Y	17/11/82

Table 1 (cont'd)

Tag series	Division	Section	Locality	Map ref.	Tag mth.	Tag type	Date rel.
H340000 - 340299	Strait of Georgia	Other Area 17	Hall Island	(C06)	SN	Short- Y	18/01/83
H343550 - 343999	Strait of Georgia	Yellow Point	Scott Island	(C07)	SN	Short- W	09/11/82
H344000 - 344499	Strait of Georgia	Other Area 17	Hall Island	(C03)	SN	Short- W	24/11/82
H345000 - 345499	West Coast of Van. Is.	Macoah Pass	Forbes Island	(E05)	SN	Short- W	28/02/83
H345500 - 345999	West Coast of Van. Is.	Macoah Pass	Toquart Bay	(E06)	SN	Short- W	06/03/83
H346000 - 346499	Johnstone Strait	Other Area 13 Strait	Chonat Bay	(B02)	SN	Short- W	11/11/82
H346500 - 346999	Johnstone Strait	Kanish Bay	Deepwater Bay	(A03)	SN	Short- W	15/11/82
H350000 - 350499	Johnstone Strait	Kanish Bay	Deepwater Bay	(A06)	SN	Short- W	18/11/82
H350500 - 350999	Johnstone Strait	Kanish Bay	Deepwater Bay	(A07)	SN	Short- W	22/11/82
H353000 - 353999	Strait of Georgia	Yellow Point	De Courcy Island	(C12)	SN	Short- P	18/11/82
H355000 - 355999	Strait of Georgia	Other Area 17	Wallace Island	(C05)	SN	Short- P	29/11/82
H356000 - 356499	Johnstone Strait	Kanish Bay	Deepwater Bay	(A03)	SN	Short- P	15/11/82
H356500 - 356999	Johnstone Strait	Other Area 13 Strait	Chonat Bay	(B03)	SN	Short- P	16/11/82
H360000 - 360499	Johnstone Strait	Other Area 13 Strait	Chonat Bay	(B05)	SN	Short- P	23/11/82
H360500 - 360999	Johnstone Strait	Other Area 13 Strait	Chonat Bay	(B06)	SN	Short- P	23/11/82
H361000 - 361499	West Coast of Van. Is.	Macoah Pass	Forbes Island	(E05)	SN	Short- Y	28/02/83
H361500 - 361999	West Coast of Van. Is.	Macoah Pass	Toquart Bay	(E06)	SN	Short- Y	06/03/83
H362000 - 362999	Strait of Georgia	Yellow Point	Boulder Point	(C15)	SN	Short- Y	30/11/82
H363000 - 363499	Strait of Georgia	Yellow Point	De Courcy Island	(C19)	SN	Short- Y	07/12/82
H363500 - 363999	Strait of Georgia	Yellow Point	De Courcy Island	(C20)	SN	Short- Y	08/12/82
H364000 - 364999	West Coast of Van. Is.	Other Area 23	Coaster Channel	(E01)	SN	Short- Y	11/03/83

Table 1 (cont'd)

Tag series	Division	Section	Locality	Map ref.	Tag mth.	Tag type	Date rel.
H371000 - 371999	Strait of Georgia	Other Area 17	Wallace Island	(C04)	SN	Short- G	28/11/82
H372000 - 372999	Strait of Georgia	Yellow Point	Yellow Point	(C17)	SN	Short- G	01/12/82
H373000 - 373499	Strait of Georgia	Yellow Point	Yellow Point	(C18)	SN	Short- G	01/12/82
H373500 - 373999	Strait of Georgia	Yellow Point	De Courcy Island	(C19)	SN	Short- G	07/12/82
H374000 - 374499	Strait of Georgia	Yellow Point	De Courcy Island	(C21)	SN	Short- G	08/12/82
H375500 - 375999	West Coast of Van. Is.	Macoah Pass	Forbes Island	(E02)	SN	Short- G	24/02/83
H377000 - 377499	West Coast of Van. Is.	Whitepine Cove	Millar Channel	(F02)	SN	Short- G	26/02/83
H377900 - 377999	West Coast of Van. Is.	Whitepine Cove	Bawden Bay	(F03)	SN	Short- G	26/02/83
H378000 - 378499	West Coast of Van. Is.	Sydney Inlet	Steamer Cove	(F01)	SN	Short- G	27/02/83
H378500 - 378999	West Coast of Van. Is.	Meares Island	Maurus Channel	(F04)	SN	Short- G	04/03/83
H379000 - 379224	North Coast	Portland Inlet	Winter Harbour	(G05)	PD	Short- G	13/03/83
H379225 - 379299	West Coast of Van. Is.	West Nootka	Anderson Point	(G01)	SN	Short- G	07/03/83
H379300 - 379349	North Coast	Portland Inlet	Winter Harbour	(G05)	PD	Short- G	13/03/83
H379350 - 379499	West Coast of Van. Is.	West Nootka	Anderson Point	(G01)	SN	Short- G	07/03/83
H379500 - 379999	North Coast	Portland Inlet	Winter Harbour	(G05)	PD	Short- G	13/03/83
H391000 - 391499	West Coast of Van. Is.	Whitepine Cove	Millar Channel	(F02)	SN	Short- Y	26/02/83
H391500 - 391999	West Coast of Van. Is.	Whitepine Cove	Bawden Bay	(F03)	SN	Short- Y	26/02/83
H392000 - 392499	West Coast of Van. Is.	Sydney Inlet	Steamer Cove	(F01)	SN	Short- Y	27/02/83
H392500 - 393499	West Coast of Van. Is.	Meares Island	Maurus Channel	(F04)	SN	Short- Y	04/03/83
H393500 - 394499	West Coast of Van. Is.	Meares Island	Hecate Bay	(F05)	SN	Short- Y	04/03/83
H395500 - 395999	West Coast of Van. Is.	Meares Island	Maurus Channel	(F06)	SN	Short- Y	07/03/83
H401000 - 401499	West Coast of Van. Is.	Nuchatlitz Inlet	Centre Island	(G04)	SN	Short- Y	27/02/83
H401500 - 401999	West Coast of Van. Is.	West Nootka	Anderson Point	(G01)	SN	Short- Y	07/03/83
H407000 - 407999	North Coast	Portland Inlet	Winter Harbour	(G05)	PD	Short- Y	13/03/83
H410000 - 410499	West Coast of Van. Is.	Nuchatlitz Inlet	Centre Island	(G02)	SN	Short- Y	26/02/83
H410500 - 410999	West Coast of Van. Is.	Nuchatlitz Inlet	Rosa Island	(G03)	SN	Short- Y	27/02/83
H992000 - 992999	Strait of Georgia	Pender Harbour	Bargain Bay	(H01)	SN	Fine - I	12/06/83

Table 2. Herring tag releases in Johnstone Strait in the fall of 1982.

Locality	Map ref.	Date D/M/Y	Tons set	Tag type: Long I	Short - by colour: Y	W	O	I	P	G	Fish rel.
Kanish Bay											
Kanish Bay	(A1)	9/11/82	30	-	-	-	-	985	-	-	985
Kanish Bay	(A2)	10/11/82	7	499	473	-	-	-	-	-	972
Deepwater Bay	(A3)	15/11/82	62	-	-	499	-	-	498	-	997
Kanish Bay	(A4)	17/11/82	7	499	499	-	-	-	-	-	998
Kanish Bay	(A5)	17/11/82	35	499	499	-	-	-	-	-	998
Deepwater Bay	(A6)	18/11/82	30	-	-	498	-	499	-	-	997
Deepwater Bay	(A7)	22/11/82	62	-	-	499	-	499	-	-	998
Subtotal for section		7 sets		1497	1471	1496	-	1983	498	-	6945
Other Area 13											
Chonat Bay	(B1)	11/11/82	0.5	-	498	-	-	-	-	-	498
Chonat Bay	(B2)	11/11/82	2	499	-	500	-	-	-	-	999
Chonat Bay	(B3)	16/11/82	7	-	-	-	497	-	500	-	997
Chonat Bay	(B4)	16/11/82	0.5	-	-	-	450	-	-	-	450
Chonat Bay	(B5)	23/11/82	7	-	-	-	499	-	499	-	998
Chonat Bay	(B6)	23/11/82	0.5	-	-	-	498	-	496	-	994
Subtotal for section		6 sets		499	498	500	1944	-	1495	-	4936
Total		13 sets		1996	1969	1996	1944	1983	1495	-	11881

Table 3. Herring tag releases in the lower Strait of Georgia and in Juan de Fuca Strait in the fall of 1982.

Locality	Map ref.	Date D/M/Y	Tons set	Tag type: Long I	Short - by colour: Y	W	O	I	P	G	Fish rel.
Other Area 17											
Chemainus	(C1)	15/11/82	150	1860	-	-	-	-	-	-	1860
Secretary Islands	(C2)	23/11/82	n.a.	450	-	-	-	-	-	-	450
Hall Island	(C3)	24/11/82	n.a.	394	-	494	-	-	-	-	888
Wallace Island	(C4)	28/11/82	100	496	-	-	-	-	-	989	1485
Wallace Island	(C5)	29/11/82	60	-	-	-	-	-	988	-	988
Hall Island	(C6)	18/01/83	2	-	296	-	-	-	-	-	296
Subtotal for section		6 sets		3200	296	494	-	-	988	989	5967
Yellow Point											
Scott Island	(C7)	9/11/82	n.a.	499	-	450	-	-	-	-	949
Yellow Point	(C8)	9/11/82	n.a.	-	499	-	-	499	-	-	998
De Courcy Island	(C9)	15/11/82	n.a.	-	2	-	-	489	-	-	491
Pilkey Point	(C10)	16/11/82	15	960	-	-	-	-	-	-	960
Ruxton Pass	(C11)	17/11/82	n.a.	-	498	-	-	-	-	-	498
De Courcy Island	(C12)	18/11/82	n.a.	-	-	-	-	-	1000	-	1000
Yellow Point	(C13)	19/11/82	11	474	-	-	-	-	-	-	474
Boulder Point	(C14)	29/11/82	150	-	-	-	996	-	-	-	996
Boulder Point	(C15)	30/11/82	100	-	995	-	-	-	-	-	995
Kulleet Bay	(C16)	30/11/82	100	-	-	-	-	998	-	-	998
Yellow Point	(C17)	1/12/82	3	-	-	-	-	-	-	998	998
Yellow Point	(C18)	1/12/82	0.5	-	-	-	-	-	-	498	498
De Courcy Island	(C19)	7/12/82	2	-	496	-	-	-	-	496	992
De Courcy Island	(C20)	8/12/82	0.5	-	491	-	497	-	-	-	988
De Courcy Island	(C21)	8/12/82	5	-	-	-	500	-	-	495	995
Subtotal for section		15 sets		1933	2981	450	1993	1986	1000	2487	12830

Table 3 (cont'd)

Locality	Map ref.	Date D/M/Y	Tons set	Tag type: Long I	Short - by colour: Y	W	O	I	P	G	Fish rel.
Other Area 19											
Albert Head	(D1)	24/11/82	8	-	992	-	-	-	-	-	992
Race Rocks	(D2)	24/11/82	8	-	-	-	710	-	-	-	710
Race Rocks	(D3)	25/11/82	65	976	-	-	264	-	-	-	1240
Race Rocks	(D4)	26/11/82	10	983	-	-	-	-	-	-	983
Subtotal for section		4 sets		1959	992	-	974	-	-	-	3925
Total		25 sets		7092	4269	944	2967	1986	1988	3476	22722

Table 4. Herring tag releases on the west coast of Vancouver Island in the spring of 1983.

Locality	Map ref.	Date D/M/Y	Tons set	Tag type: Long I	Short - by colour: Y	W	O	I	P	G	Fish rel.
Other Area 23 (section)											
Coaster Channel	(E1)	11/03/83	75	992	986	-	-	-	-	-	1978
Macoah Pass (section)											
Forbes Island	(E2)	24/02/83	45	-	-	-	-	-	-	497	497
St. Ines Island	(E3)	26/02/83	125	498	497	-	-	-	-	-	995
Shears Islands	(E4)	27/02/83	100	499	500	-	-	-	-	-	999
Forbes Island	(E5)	28/02/83	30	-	500	499	-	-	-	-	999
Toquart Bay	(E6)	6/03/83	10	-	497	473	-	-	-	-	970
Subtotal for Barkley Sound		6 sets		1989	2980	972	-	-	-	497	6438
Sidney Inlet (section)											
Steamer Cove	(F1)	27/02/83	15	-	493	-	-	-	-	491	984
Whitepine Cove (section)											
Millar Channel	(F2)	26/02/83	3	-	497	-	-	-	-	498	995
Bawden Bay	(F3)	26/02/83	75	-	352	-	-	-	-	56	408
Meares Island (section)											
Maurus Channel	(F4)	4/03/83	55	-	980	-	-	-	-	495	1475
Hecate Bay	(F5)	4/03/83	70	-	988	-	-	497	-	-	1485
Maurus Channel	(F6)	7/03/83	80	-	490	-	-	499	-	-	989
Subtotal for Clayoquot Sound		6 sets		-	3800	-	-	996	-	1540	6336

Table 4 (cont'd)

Locality	Map ref.	Date D/M/Y	Tons set	Tag type: Long I	Short - by colour: Y	W	O	I	P	G	Fish rel.
West Nootka (section)											
Anderson Point	(G1)	7/03/83	2	-	495	-	-	-	-	223	718
Nuchatlitz Inlet (section)											
Centre Island	(G2)	26/02/83	30	-	494	-	490	-	-	-	984
Rosa Island	(G3)	27/02/83	15	-	487	-	489	-	-	-	976
Centre Island	(G4)	27/02/83	15	-	496	-	495	-	-	-	991
Winter Harbour (section)											
Winter Harbour	(G5)	13/03/83	pond	-	989	-	-	-	-	768	1757
Subtotal for upper west coast		5 sets		-	2961	-	1474	-	-	991	5426
Total for west coast		17 sets		1989	9741	972	1474	996	-	3028	18200

Table 5. Age distribution of herring in tagging sets made in Johnstone Strait in the fall of 1982.

Map ref.	Locality	n	Percent at age				
			2	3	4	5	6+
Kanish Bay (section)							
(A1)	Kanish Bay	N/S					
(A2)	Kanish Bay	87	13	56	21	7	3
(A3)	Deepwater Bay	86	34	43	16	6	1
(A4)	Kanish Bay	85	46	35	8	4	7
(A5)	Kanish Bay	82	28	55	11	2	4
(A6)	Deepwater Bay	88	11	57	15	16	1
(A7)	Deepwater Bay	74	0	43	19	20	18
Other Area 13 (section)							
(B1)	Chonat Bay	83	12	48	17	11	12
(B2)	Chonat Bay	88	32	56	7	2	3
(B3)	Chonat Bay	90	24	52	11	6	7
(B4)	Chonat Bay	N/S					
(B5)	Chonat Bay	89	3	57	24	6	10
(B6)	Chonat Bay	84	6	68	17	2	7

Table 6. Age distribution of herring in tagging sets made in the lower Strait of Georgia and in Juan de Fuca Strait in the fall of 1982.

Map ref.	Locality	n	Percent at age				
			2	3	4	5	6+
Other Area 17 (section)							
(C1)	Chemainus	81	0	21	40	10	30
(C2)	Secretary Island	N/S					
(C3)	Hall Island	77	1	18	52	18	10
(C4)	Wallace Island	80	1	44	43	10	3
(C5)	Wallace Island	74	3	34	43	18	3
(C6)	Hall Island	81	6	52	27	11	4
Yellow Point (section)							
(C7)	Scott Island	81	7	44	31	9	9
(C8)	Yellow Point	81	5	41	36	12	6
(C9)	De Courcy Island	78	5	63	24	3	5
(C10)	Pilkey Point	69	6	41	22	23	9
(C11)	Ruxton Pass	88	6	75	9	9	1
(C12)	De Courcy Island	83	4	60	23	8	5
(C13)	Yellow Point	70	16	59	19	4	3
(C14)	Boulder Point	74	1	47	32	8	11
(C15)	Boulder Point	75	1	53	27	9	9
(C16)	Kulleet Bay	85	2	47	34	11	6
(C17)	Yellow Point	83	7	71	16	4	2
(C18)	Yellow Point	N/S					
(C19)	De Courcy Island	63	2	30	33	19	16
(C20)	De Courcy Island	68	1	49	31	12	7
(C21)	De Courcy Island	81	2	51	36	6	5

Table 6 (cont'd)

Map ref.	Locality	n	Percent at age				
			2	3	4	5	6+
Other Area 19 (section)							
(D1)	Albert Head	71	6	35	44	11	4
(D2)	Race Rocks	61	5	21	33	21	20
(D3)	Race Rocks	72	3	36	38	15	8
(D4)	Race Rocks	72	13	69	17	1	0

Table 7. Age distribution, percent maturity (G.I. > 0.10), and average gonosomatic index (G.I.) of herring in seine sets for spring 1983 taggings on the west coast of Vancouver Island.

Map ref.	Locality	n	% at age					% mature		Av. G.I.	
			2	3	4	5	6+	MM	FF	MM	FF
Barkley Sound											
(E1)	Coaster Channel	79	0	11	29	24	35	95	100	0.19	0.31
(E2)	Forbes Island	73	0	14	26	30	30	100	100	0.21	0.28
(E3)	St. Ines Island	89	3	13	31	22	29	98	100	0.21	0.28
(E4)	Shears Island	93	3	17	26	23	31	100	100	0.21	0.30
(E5)	Forbes Island	56	2	34	21	23	20	-	-	-	-
(E6)	Toquart Bay	91	20	33	20	13	14	98	100	0.20	0.29
Clayoquot Sound											
(F1)	Steamer Cove	89	31	45	6	9	9	91	96	0.17	0.18
(F2)	Millar Channel	96	5	26	24	15	30	97	100	0.21	0.25
(F3)	Bawden Bay	95	6	43	31	11	9	96	100	0.18	0.22
(F4)	Maurus Channel	90	7	30	23	22	18	100	97	0.20	0.28
(F5)	Hecate Bay	86	1	24	20	21	34	95	100	0.19	0.29
(F6)	Maurus Channel	95	4	24	17	22	33	98	100	0.19	0.29
Upper west coast											
(G1)	Anderson Point	N/S	-	-	-	-	-	-	-	-	-
(G2)	Centre Island	80	0	9	15	26	50	100	100	0.22	0.29
(G3)	Rosa Island	97	0	4	13	26	57	100	100	0.23	0.27
(G4)	Centre Island	86	0	20	31	19	30	-	-	-	-
(G5)	Winter Harbour	55	2	20	31	11	36	23	44	0.08	0.11

Table 8. Number of tag recoveries from the beginning of tagging in the fall of 1979 to the end of the 1982-83 fishing season.

Season and Fishery of recovery	Year and season of release								
	1979 Fall	1980 Spring	1980 Fall	1981 Spring	1981 Fall	1982 Spring	1982 Fall	1983 Spring	All
1979-80 Summer-Fall									
Food	28	-	-	-	-	-	-	-	28
Winter	3	-	-	-	-	-	-	-	3
Roe	2	10	-	-	-	-	-	-	12
Spring	2	12	-	-	-	-	-	-	14
Season	35	22	-	-	-	-	-	-	57
1980-81 Summer-Fall	0	6	1	-	-	-	-	-	7
Food	0	4	14	-	-	-	-	-	18
Winter	0	0	7	-	-	-	-	-	7
Roe	3	12	27	90	-	-	-	-	132
Spring	0	3	0	18	-	-	-	-	21
Season	3	25	49	108	-	-	-	-	185
1981-82 Summer-Fall	0	0	0	4	-	-	-	-	4
Food	0	1	7	20	313	-	-	-	341
Winter	0	1	2	3	31	-	-	-	37
Roe	0	13	10	38	193	309	-	-	563
Spring	0	0	0	0	2	1	-	-	3
Season	0	15	19	65	539	310	-	-	948
1982-83 Summer-Fall	0	0	1	1	0	3	3	-	8
Food	0	0	0	0	7	0	65	-	72
Winter	0	0	0	0	6	0	64	-	70
Roe	0	1	5	8	43	32	163	89	341
Spring	0	0	0	0	0	0	1	0	1
Season	0	1	6	9	56	35	296	89	492
1979-83 Summer-Fall	0	6	2	5	0	3	3	-	19
Food	28	5	21	20	320	0	65	-	459
Winter	3	1	9	3	37	0	64	-	117
Roe	5	36	42	136	236	341	163	89	1048
Spring	2	15	0	18	2	1	1	0	39
Total	38	63	74	182	595	345	296	89	1682

Table 9. Number of tag recoveries by the period at large for the 1979-1980 to 1982-83 seasons.

Season	Period at large					
	≤ 1 mo.	> 1 mo. to ≤ 3 mo.	> 3 mo. to ≤ 6 mo.	> 6 mo. to ≤ 1 yr	> 1 yr to ≤ 2 yr	> 2 yr
1979-80	38	15	4	-	-	-
1980-81	105	25	33	16	6	-
1981-82	622	32	199	68	27	0
1982-83	157	64	167	39	59	6

Table 10. Summary of major tag releases on the south coast of British Columbia.

Location	Release		No. of tags
	Year	Season	
Offshore west coast	1980	Fall	14,349
	1981	Fall	10,391
Inner Juan de Fuca	1982	Fall	3,925
Lower Strait of Georgia	1980	Fall	8,600
	1981	Fall	19,755
	1982	Fall	18,797
Johnstone Strait	1982	Fall	11,881
Barkley Sound	1982	Spring	17,860

Table 11. Tons of catch for fisheries, by gear (GN = gillnet, SN = seine), in which tags from south coast taggings were recovered.

Fishery			Statistical area						
year	type	gear	15	14	17N	17S	23	24	25
1980	Food	all	-	-	-	3,225	-	-	-
1981	Roe	GN	-	7,024	-	-	620	1,796	1,099
		SN	-	2,883	-	-	3,400	-	-
		all	-	9,907	-	-	4,020	1,796	1,099
1981	Food	all	-	-	-	6,092	-	-	-
1982	Roe	GN	-	6,000	-	-	-	885	2,100
		SN	-	-	-	3,400	4,200	700	-
		all	-	6,000	-	3,400	4,200	1,585	2,100
1982	Food	all	-	-	-	1,388	-	-	-
1983	Roe	GN	-	9,200	-	-	-	-	2,500
		SN	3,800	1,800	2,000	280[a]	5,700	-	-
		all	3,800	11,000	2,000	280[a]	5,700	-	2,500

[a]No commercial fishery - charter payment catch only.

Table 12. Plant recovery rates used for tag recovery adjustments (Haegele 1984). Estimated rates are in parenthesis.

Tag type - colour	Fishery					
	80-Fo	81-Ro	81-Fo	82-Ro	82-Fo	83-Ro
Standard - Int. orange	(0.37)	(0.40)	0.37	(0.40)	0.52	(0.40)
Short - Int. orange	-	-	-	(0.34)	(0.34)	0.34
Short - Orange	-	-	-	(0.34)	(0.34)	0.34
Short - Pink	-	-	-	(0.34)	(0.34)	0.34
Short - Yellow	-	-	-	(0.21)	(0.21)	0.21
Short - White	-	-	-	(0.21)	(0.21)	0.21
Short - Green	-	-	-	(0.21)	(0.21)	0.21

Table 13. Expected tag returns from 1,000 tags in a population of 20,000 tonnes for 5,000 tonnes seine and gillnet fisheries. It is assumed that seines are not age selective while gillnets fish only one-half of the 4-yr-old and all of the 5-yr-old and older fish.

Age	Percent	weight	tags in	fish in	Fish in catch($\times 10^{-6}$)		Tags in catch	
(yrs)	at age	at age (g)	population	population ($\times 10^{-6}$)	SN	GN	SN	GN
2	5	60	50	9.8	2.4	0.0	12.5	0.0
3	45	85	450	88.0	22.0	0.0	112.5	0.0
4	30	110	300	58.7	14.7	16.9	75.0	86.5
> 5	20	140	200	39.1	9.8	22.5	50.0	114.6
Total			1,000	195.6	48.9	39.3	250.0	201.1

Table 14. Recoveries (adjusted for gear and plant recovery rates) in 1980-83 fisheries from 1980-81 fall taggings offshore the west coast of Vancouver Island.

Release		Fishery		Area of recovery						
Time	No.	type	gear	15	14	17N	17S	23	24	25
80-Fa	14,349	80-Fo	all	-	-	-	11	-	-	-
		81-Ro	GN	-	0	-	-	0	4	0
			SN	-	3	-	-	3	-	9
			all	-	3	-	-	3	4	9
		81-Fo	all	-	-	-	8	-	-	-
		82-Ro	GN	-	0	-	-	-	0	0
			SN	-	-	-	3	8	0	-
			all	-	0	-	3	8	0	0
		82-Fo	all	-	-	-	0	-	-	-
		83-Ro	GN	-	0	-	-	-	-	0
			SN	0	0	0	(3)	3	-	-
			all	0	0	0	(3)	3	-	0
81-Fa	10,391	81-Fo	all	-	-	-	3	-	-	-
		82-Ro	GN	-	7	-	-	-	0	7
			SN	-	-	-	23	26	3	-
			all	-	7	-	23	26	3	7
		82-Fo	all	-	-	-	2	-	-	-
		83-Ro	GN	-	14	-	-	-	-	3
			SN	0	0	3	(3)	6	-	-
			all	0	14	3	(3)	6	-	3

Table 15. Tag density (tags per 10,000 released per 1,000 tons) in population for 1980-83 fisheries from 1980-81 fall taggings offshore the west coast of Vancouver Island.

Time of release	Fishery type	Fishery gear	Av. days at large	Area of recovery 15	14	17N	17S	23	24	25
80-Fa	80-Fo	all	65	-	-	-	2.34	-	-	-
	81-Ro	GN	-	-	0.00	-	-	0.00	1.42	0.00
		SN	-	-	0.71	-	-	0.60	-	2.03
		all	169	-	0.21	-	-	0.51	1.42	1.48
	81-Fo	all	428	-	-	-	0.93	-	-	-
	82-Ro	GN	-	-	0.00	-	-	-	0.00	0.00
		SN	-	-	-	-	0.51	1.24	0.00	-
		all	538	-	0.00	-	0.51	1.24	0.00	0.00
	82-Fo	all	-	-	-	-	0.00	-	-	-
	83-Ro	GN	-	-	0.00	-	-	-	-	-
		SN	-	0.00	0.00	0.00	(6.22)	0.31	-	-
		all	895	0.00	0.00	0.00	(6.22)	0.31	-	0.00
81-Fa	81-Fo	all	62	-	-	-	0.43	-	-	-
	82-Ro	GN	-	-	1.12	-	-	-	0.00	3.08
		SN	-	-	-	-	6.50	5.92	3.95	-
		all	175	-	1.12	-	6.50	5.92	1.74	3.08
	82-Fo	all	433	-	-	-	1.32	-	-	-
	83-Ro	GN	-	-	1.44	-	-	-	-	1.06
		SN	-	0.00	0.00	1.32	(9.45)	0.93	-	-
		all	529	0.00	1.20	1.32	(9.45)	0.93	-	1.06

Table 16. Recoveries (adjusted for gear and plant recovery rates) in the 1983 roe fisheries from 1982 fall taggings in inner Juan de Fuca Strait.

Release		Fishery		Area of recovery						
time	no.	type	gear	15	14	17N	17S	23	24	25
82-Fa	3,925	83-Ro	GN	-	3	-	-	-	-	0
			SN	5	0	10	(8)	15	-	-
			all	5	3	10	(8)	15	-	0

Table 17. Tag density (tags per 10,000 releases per 1,000 tons) in population for 1983 roe fishery from 1982 fall taggings in the inner Juan de Fuca Strait.

Time of	Fishery		Av. days at	Area of recovery						
release	type	gear	large	15	14	17N	17S	23	24	25
82-Fa	83-Ro	GN	-	-	0.87	-	-	-	-	0.00
		SN	-	3.35	0.00	12.74	(68.24)	6.70	-	-
		all	99	3.35	0.72	12.74	(68.24)	6.70	-	0.00

Table 18. Recoveries (adjusted for gear and plant recovery rates) in 1981-83 herring fisheries from 1980-82 fall taggings in the lower Strait of Georgia.

Release		Fishery		Area of recovery						
time	no.	type	gear	15	14	17N	17S	23	24	25
80-Fa	8,600	81-Ro	GN	-	25	-	-	0	0	0
			SN	-	10	-	-	0	-	-
			all	-	35	-	-	0	0	0
		81-Fo	all	-	-	-	10	-	-	-
		82-Ro	GN	-	3	-	-	-	0	0
			SN	-	-	-	12	0	0	-
			all	-	3	-	12	0	0	0
		82-Fo	all	-	-	-	0	-	-	-
		83-Ro	GN	-	3	-	-	-	-	0
			SN	0	0	0	(0)	0	-	-
			all	0	3	0	(0)	0	-	0
81-Fa	19,755	82-Ro	GN	-	145	-	-	-	0	0
			SN	-	-	-	293	8	0	0
			all	-	145	-	293	8	0	0
		82-Fo	all	-	-	-	11	-	-	-
		83-Ro	GN	-	31	-	-	-	-	4
			SN	4	8	17	(8)	8	-	-
			all	4	39	17	(8)	8	-	4
82-Fa	18,797	83-Ro	GN	-	88	-	-	-	-	4
			SN	40	42	176	(26)	35	-	-
			all	40	130	176	(26)	35	-	4

Table 19. Tag density (tags per 10,000 releases per 1,000 tons) in population for 1981-83 fisheries from 1980-82 fall taggings in the lower Strait of Georgia.

Time of release	Fishery type	Fishery gear	Av. days at large	Area of recovery 15	14	17N	17S	23	24	25
80-Fa	81-Ro	GN	-	-	4.14	-	-	0.00	0.00	0.00
		SN	-	-	4.03	-	-	0.00	-	-
		all	87	-	4.11	-	-	0.00	0.00	0.00
	81-Fo	all	348	-	-	-	1.91	-	-	-
	82-Ro	GN	-	-	0.58	-	-	-	0.00	0.00
		SN	-	-	-	-	4.10	0.00	0.00	-
		all	475	-	0.58	-	4.10	0.00	0.00	0.00
	82-Fo	all	-	-	-	-	0.00	-	-	-
	83-Ro	GN	-	-	0.32	-	-	-	-	0.00
		SN	-	0.00	0.00	0.00	(0.00)	0.00	-	-
		all	832	0.00	0.26	0.00	(0.00)	0.00	-	0.00
81-Fa	82-Ro	GN	-	-	12.25	-	-	-	0.00	0.00
		SN	-	-	-	-	43.61	0.96	0.00	-
		all	102	-	12.25	-	43.61	0.96	0.00	0.00
	82-Fo	all	370	-	-	-	4.18	-	-	-
	83-Ro	GN	-	-	1.68	-	-	-	-	0.77
		SN	-	0.55	2.34	4.21	(15.02)	0.74	-	-
		all	464	0.55	1.79	4.21	(15.02)	0.74	-	0.77
82-Fa	83-Ro	GN	-	-	5.06	-	-	-	-	0.89
		SN	-	5.61	12.47	46.84	(49.06)	3.26	-	-
		all	100	5.61	6.27	46.84	(49.06)	3.26	-	0.89

Table 20. Recoveries (adjusted for gear and plant recovery rates) in 1983 roe fisheries from 1982 fall taggings in Johnstone Strait.

Release		Fishery		Area of recovery						
time	no.	type	gear	15	14	17N	17S	23	24	25
82-Fa	11,881	83-Ro	GN	-	8	-	-	-	-	0
			SN	11	6	7	(0)	7	-	-
			all	11	14	7	(0)	7	-	0

Table 21. Tag density (tags per 10,000 releases per 1,000 tons) in population for 1983 roe fisheries from 1982 fall taggings in Johnstone Strait.

Time of	Fishery		Av. days at	Area of recovery						
release	type	gear	large	15	14	17N	17S	23	24	25
82-Fa	83-Ro	GN	-	-	0.73	-	-	-	-	0.00
		SN	-	2.44	2.98	2.68	(0.00)	1.09	-	-
		all	105	2.44	1.10	2.68	(0.00)	1.09	-	0.00

Table 22. Recoveries (adjusted for gear and plant recovery rates) in 1983 roe fisheries from 1982 spring taggings in Barkley Sound.

Release		Fishery		Area of recovery						
time	no.	type	gear	15	14	17N	17S	23	24	25
82-Sp	17,860	83-Ro	GN	-	3	-	-	-	-	0
			SN	0	0	3	(0)	49	-	0
			all	0	3	3	(0)	49	-	0

Table 23. Tag density (tags per 10,000 releases per 1,000 tons) in population for 1983 roe fisheries from 1982 spring taggings in Berkley Sound.

Time of	Fishery		Av. days at	Area of recovery						
release	type	gear	large	15	14	17N	17S	23	24	25
82-Sp	83-Ro	GN	-	-	0.19	-	-	-	-	0.00
		SN	-	0.00	0.00	0.82	(0.00)	4.83	-	0.00
		all	364	0.00	0.16	0.82	(0.00)	4.83	-	0.00

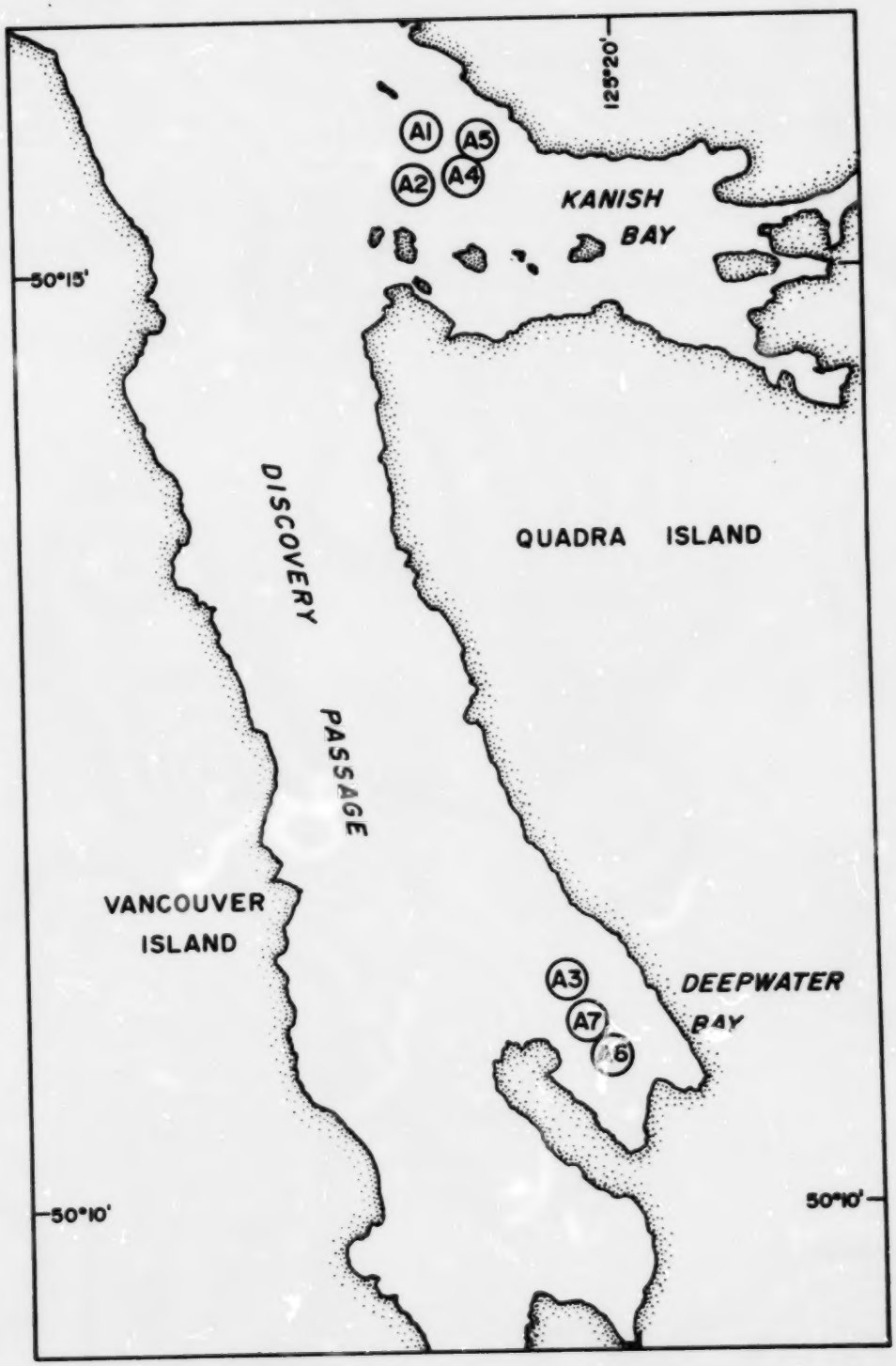

Fig. 1. Map of Discovery Passage showing fall 1982 Johnstone Strait (A) tagging locations.

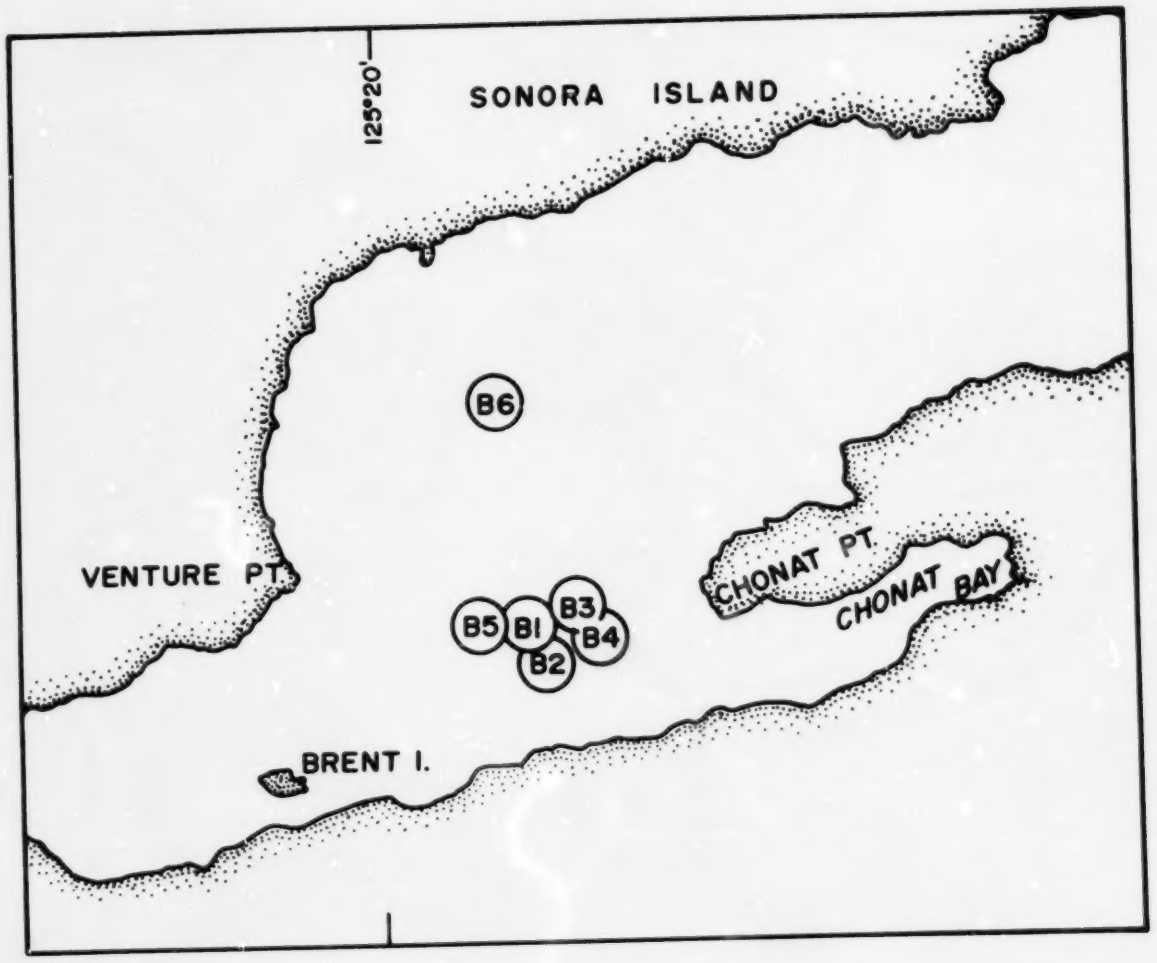

Fig. 2. Map of Okisollo Channel showing fall 1982 Johnstone Strait (B) tagging locations.

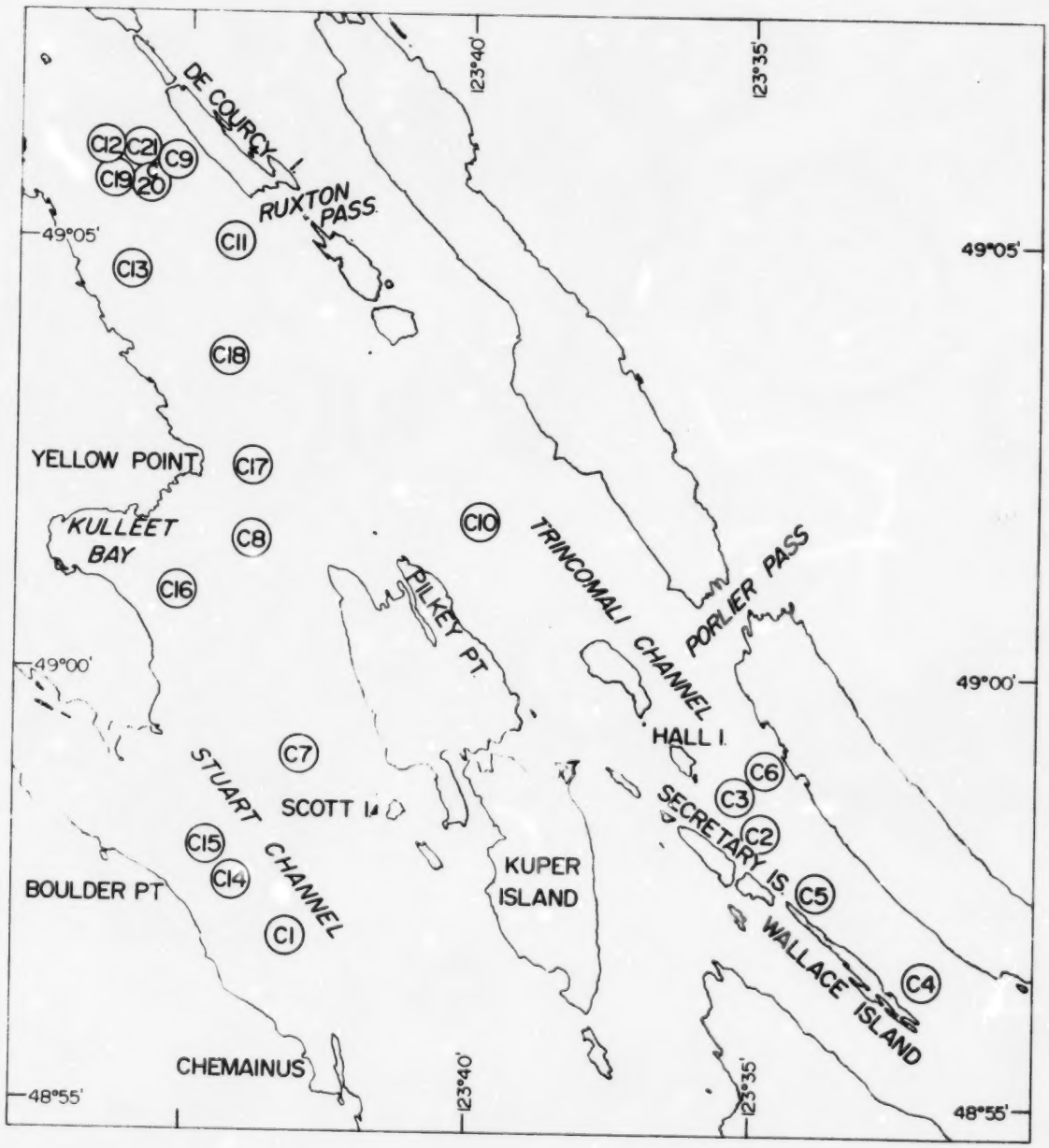

Fig. 3. Map of the lower east coast of the Strait of Georgia showing fall 1982 (C) tagging locations.

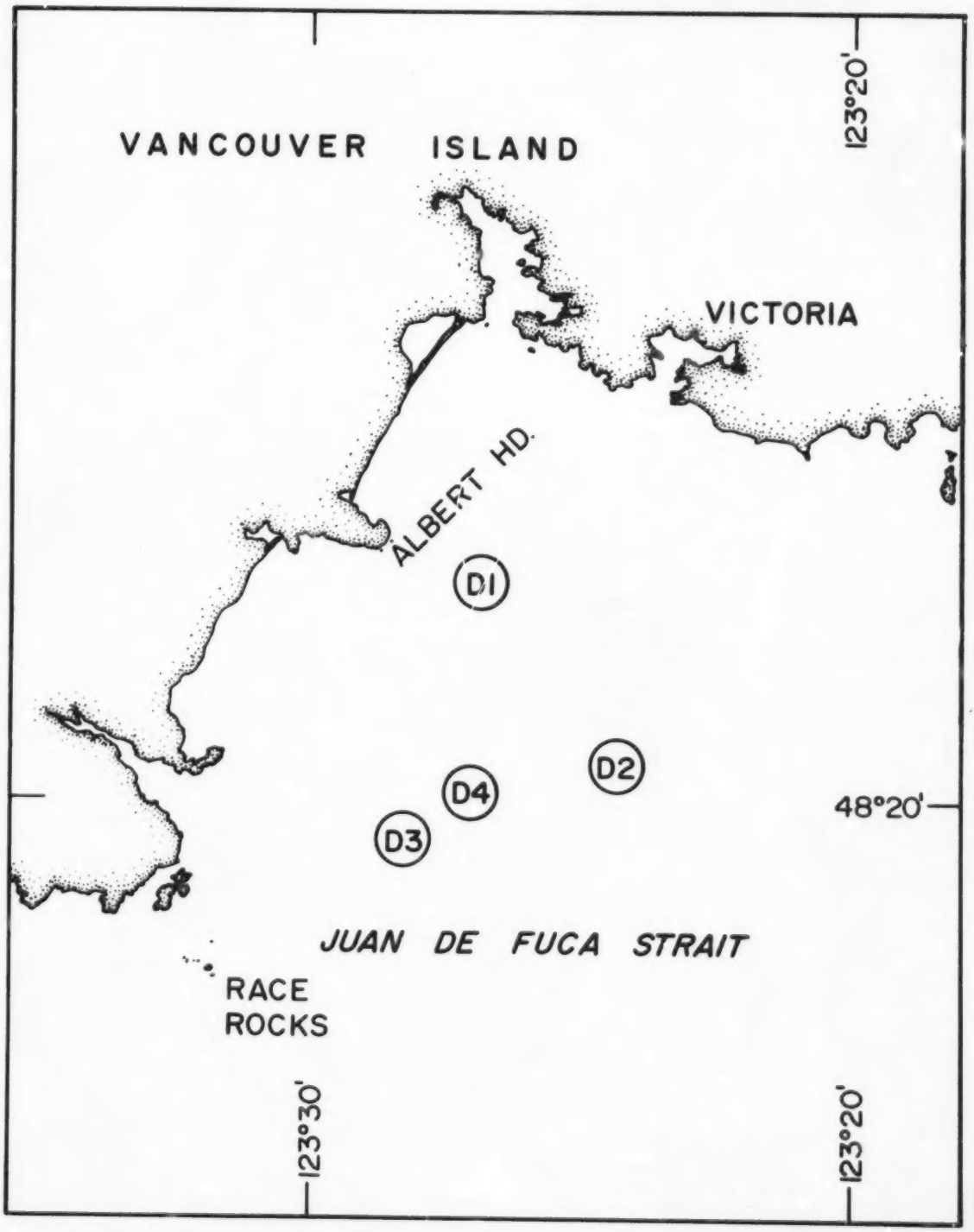

Fig. 4. Map of the inner Juan de Fuca Strait showing fall 1982 (D) tagging locations.

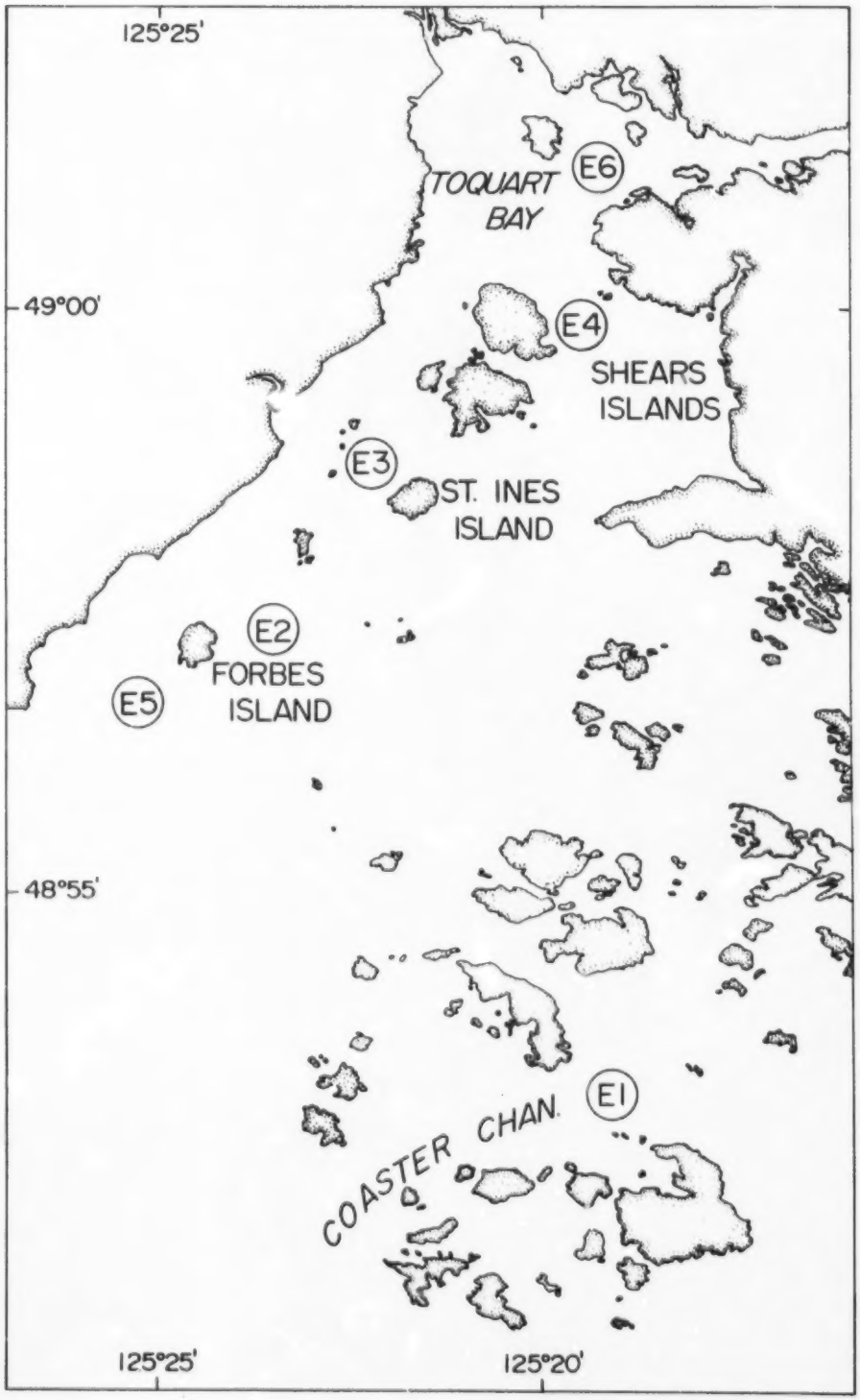

Fig. 5. Map of Barkley Sound showing spring 1983 (E) tagging locations.

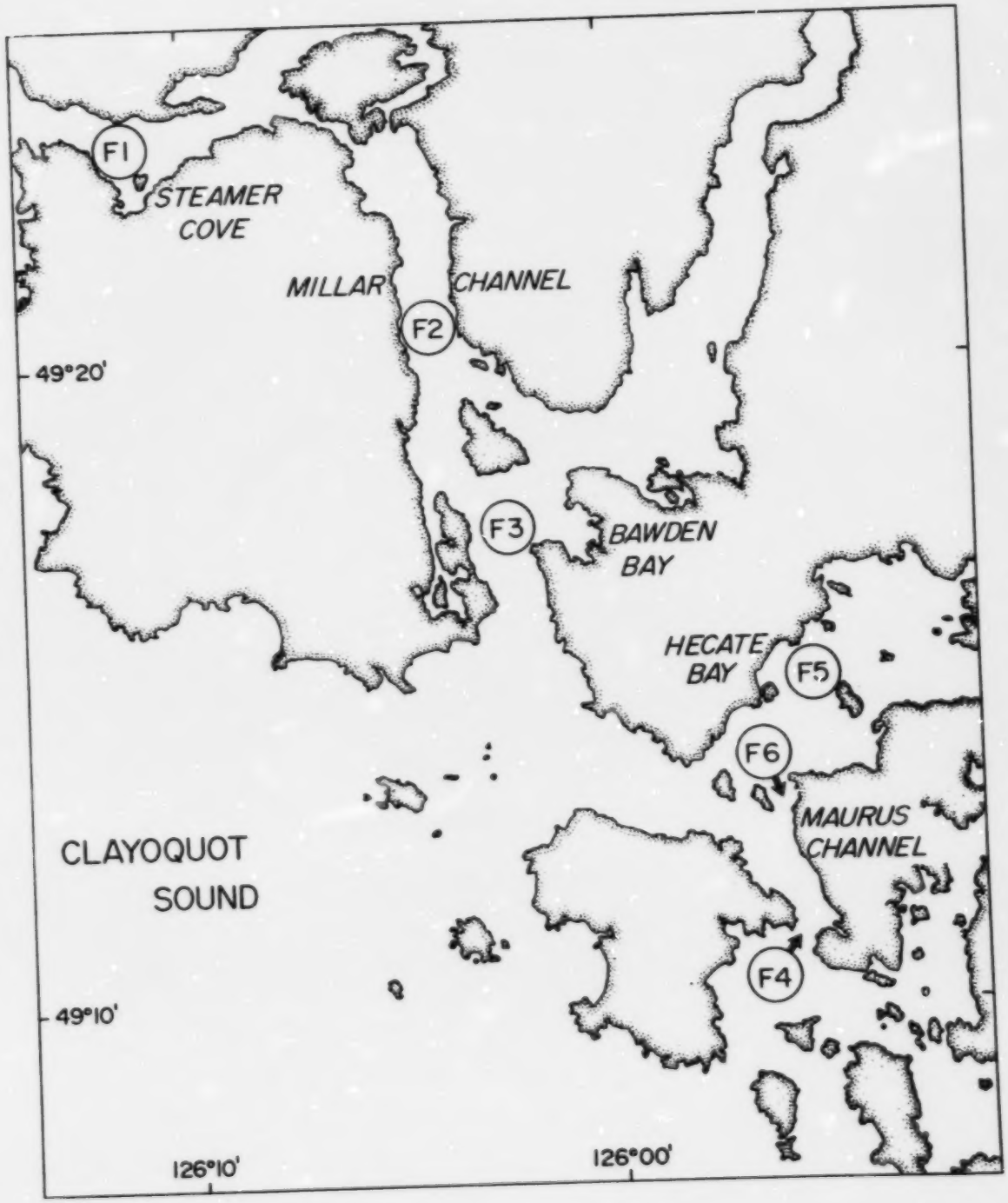

Fig. 6. Map of Clayoquot Sound showing spring 1983 (F) tagging locations.

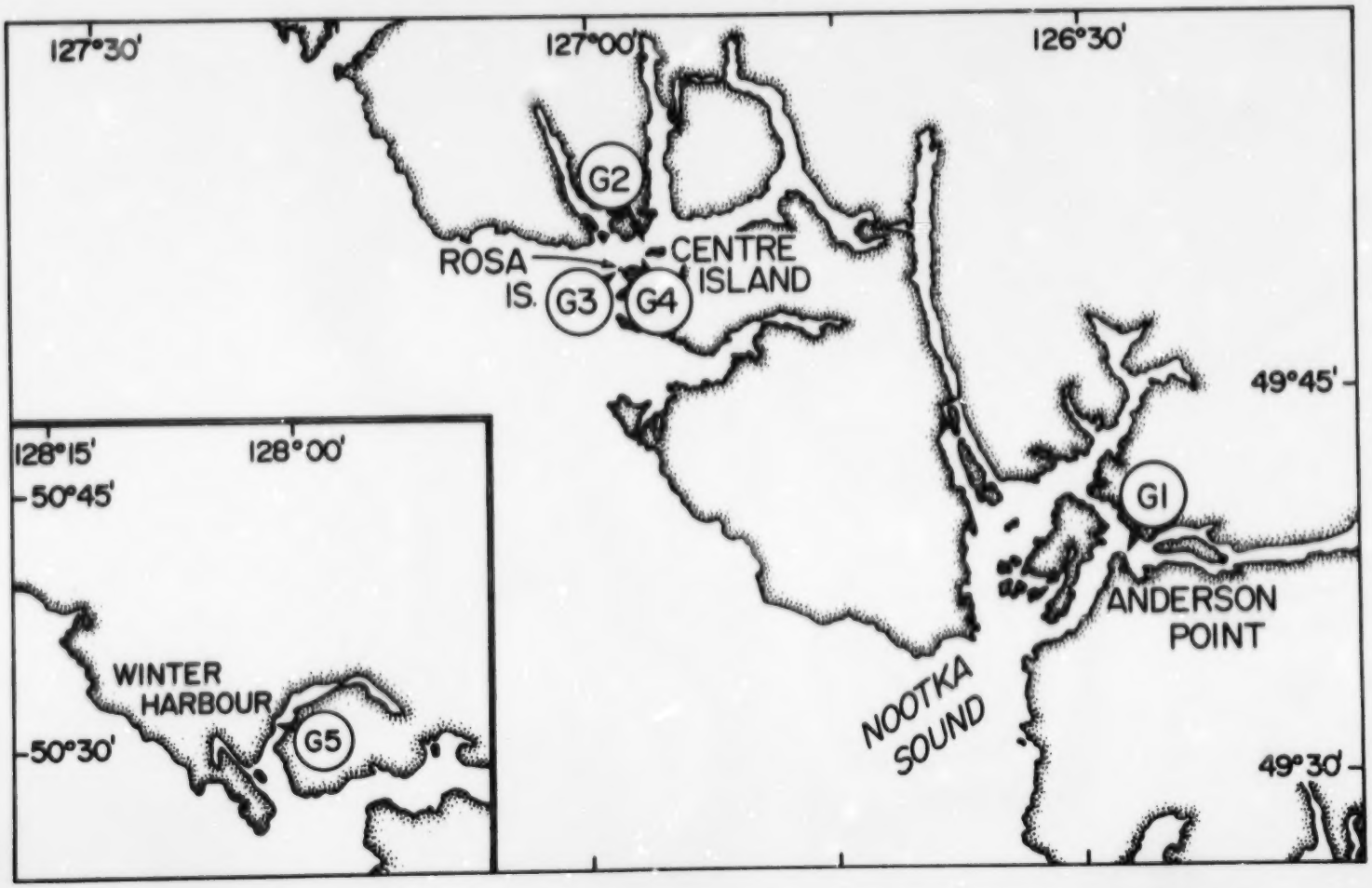

Fig. 7. Map of the upper west coast of Vancouver Island showing spring 1983 (G) tagging locations.

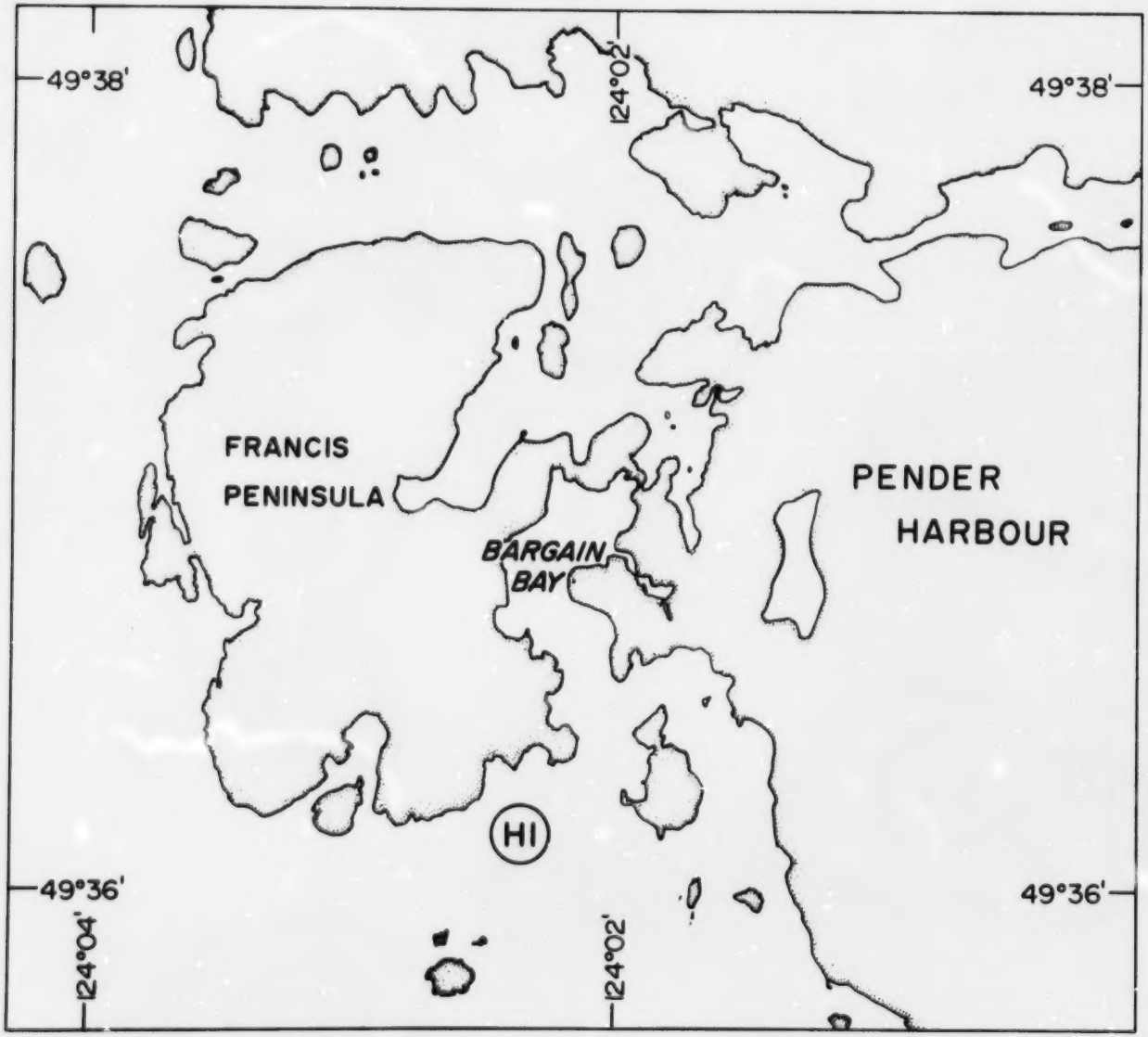

Fig. 8. Map of Pender Harbour showing summer 1983 (H) tagging locations.

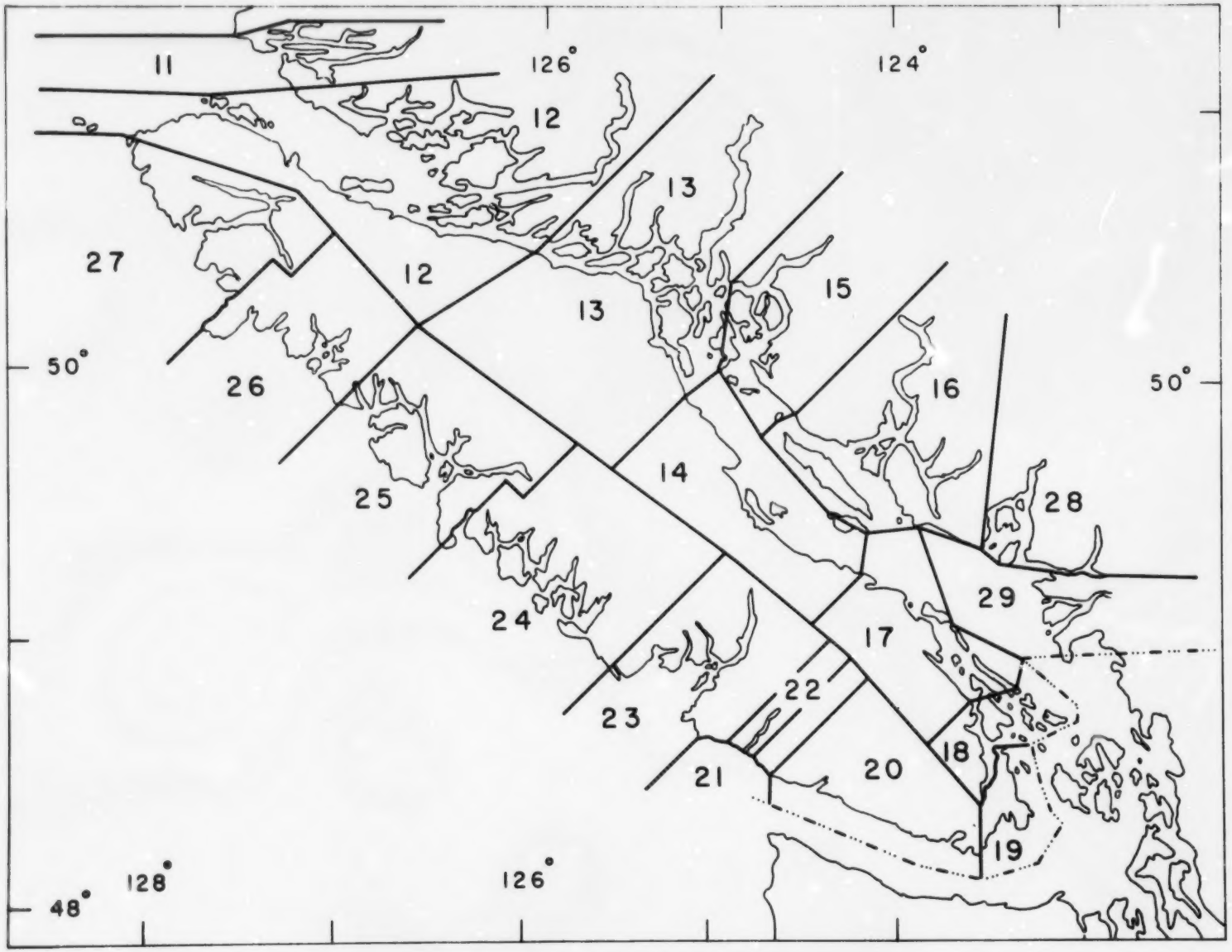

Fig. 9. Statistical areas for the south coast of British Columbia.

Appendix table 1. Winners of the February, 1983 semi-annual herring tag prize draw.

Name	Amount	Plant
Richard Rozon	$ 500	B.C. Packers Ltd. (Victoria)
Greg Smith	$ 100	North Sea Products Ltd. (Vancouver)
Carl Caunce*	$ 100	Long Beach Shellfish (Delta)
Kazumi Miyaji	$ 100	Areo Trading Co. Ltd. (Vancouver)
Carl Caunce*	$ 100	Long Beach Shellfish (Delta)
Gary Thompson	$ 100	Fishermen (Nanaimo)
Carl Caunce*	$ 50	Long Beach Shellfish (Delta)
Greg Smith	$ 50	North Sea Products Ltd. (Vancouver)
Tatsuo Gibo	$ 50	J. S. McMillan Fisheries Ltd. (Vancouver)
Kelly Knutsen	$ 50	S. S. I. Sea Products Ltd. (Ganges)
Dorthy Tong	$ 50	Quality Fish Co. Ltd. (Vancouver)
Kelly Knutsen	$ 50	S. S. I. Sea Products Ltd. (Ganges)
Murray Sharpe	$ 50	J. S. McMillan Fisheries Ltd. (Vancouver)
Gordon Peterson	$ 50	Ocean Fisheries Ltd. (Vancouver)
Carl Caunce*	$ 50	Long Beach Shellfish (Delta)
Bob Shearer*	$ 50	Shearer Fish Co. Ltd. (Delta)

*Tags pooled by employees.

Appendix table 2. Winners for the July 1983 semi-annual herring tag prize draw.

Name	Amount	Plant
Pamela Hrycenko	$ 500	Canadian Fishing Co. Ltd. (Vancouver)
Kevin Park	$ 100	North Sea Products Ltd. (Vancouver)
Janey Chiu	$ 100	B.C. Packers Ltd. (Richmond)
Amy Hayashida & Ruth Sammartino	$ 100	J. S. McMillan Fisheries Ltd. (Vancouver)
June Lemaitre	$ 100	Hub City Fishing Co. (Nanaimo)
June Moody	$ 100	Canadian Fishing Co. Ltd. (Vancouver)
Kam Siu Leung	$ 50	Canadian Fishing Co. Ltd. (Vancouver)
Shum Chee Lam	$ 50	Quality Fish Co. Ltd. (Vancouver)
Rosa Costa	$ 50	Prince Rupert Fishermen's Co-op (Prince Rupert)
Yuet Lin Lee	$ 50	B.C. Packers Ltd. (Richmond)
Dorothy Eckman	$ 50	J. S. McMillan Fisheries Ltd. (Vancouver)
Terry Binnersley	$ 50	Fisherman (Heriot Bay)
Brian Williams	$ 50	Ocean Fisheries Ltd. (Vancouver)
Kang Soon Ahn	$ 50	Cassiar Packing Co. Ltd. (Richmond)
Tino Moscato	$ 50	Seafood Products Ltd. (Vancouver)
Lai Kwan Chow	$ 50	B. C. Packers Ltd. (Richmond)